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ABSTRACT

The teaching guide presents social studies activities to help ninth graders learn about environmental concepts, problems, and responsibilities. Based on the Indian River County environment in Florida, it is part of a series for teachers, students, and community members. The introduction describes the county's geography, natural resources, endangered wildlife, and local environmental issues. The main portion of the guide presents activities based on three major concepts: environmental effects of population increase, impact of society's demands on finite resources, and individual responsibility for protecting the environment. The activities involve study of crime and disease rates in proportion to population density, research into community air pollution problems, debate over the benefits of recycling, analysis of families' needs for goods and services which deplete natural resources, and observation of city council sessions when environmental issues are discussed. Appendices present charts and maps of natural resource supply and use; and an outline of Florida school regulations concerning educational fieldtrips. (AV)

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INDIAN RIVER COUNTY

ENVIRONMENTAL EDUCATION INSTRUCTIONAL GUIDE

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Florida State Department of Education

SOCIAL STUDIES
GRADE NINE

1975

SO 011 049

INDIAN RIVER COUNTY
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ENVIRONMENTAL EDUCATION

INSTRUCTIONAL GUIDE

This publication serves as the teaching nucleus for Environmental Education activities in Junior High. The development of this program is a joint effort of teachers and staff of the Indian River County Schools.

This Guide was developed by: Mr. Reuben Lane
Vero Beach Junior High School

The Introduction was written by Mr. Phil Parisi

We wish to thank the Title III, E.S.E.A. Lee County Environmental Education Project as the conceptual framework for the organization of the guides comes from their work. Also, some of the activities in this guide are from their Interdisciplinary Concepts and Activities Guides.

This publication is one in a series developed by the Environmental Education Program for Indian River County Schools. This series is designed to be used by teachers, students and community members to help them to utilize community resources in developing and teaching environmental concepts, responsibility and in seeking ways to solve environmental problems. All materials are in pilot form and may be revised.

The work presented or reported herein was performed pursuant to a grant from the State Department of Education, Office of Environmental Education.

INTRODUCTION

ABOUT THE ENVIRONMENT

The environment is perhaps the most important complex of systems for man. Yet it is perhaps the most abused. It is becoming trite to say this, but none the less true--unless we change our ways, we will die.

Throughout history men have been able to change. They have done this with much pain and toil. The responsibility of this change has in the past rested on certain individual leaders. Today these leaders must reach a wide population and they must reach them at a time when habits are forming. The teachers of today are the leaders who must take up the cause of educating future populations about the delicate balance we live in.

It seems strange that many peoples of the world (American Indians, for one) need no formal or separate environmental education program for their young. Indian children grow up with the notion that the universe and the environment is one living thing. It must be respected and revered as something sacred. But somehow, modern man has lost vision of that simple concept, if indeed he ever possessed it. Environmental education is a way we can regain a respect that seems to come natural to some populations. It is a way we can be fit for survival and for prevailing on Earth.

In the year 2006, the earth will have doubled the present number of people. Within just 35 years another 3 billion people will be competing for the world's already taxed resources. This is not a problem of future generations, but an existing one that you and your students are already witnessing. As the population soars, crime rates, suicides, and psychological disorders increase at disproportional rates. More species are constantly being added to the endangered species lists, and more wilderness areas are continually being infringed upon by development. Our soil is lost at an alarming rate as it, with a heavy load of fertilizer, is being washed by rains into our precious water supplies.

INTRODUCTION

ABOUT ENVIRONMENTAL EDUCATION

There doesn't appear to be any part of this planet that is not affected by man's hand. Distributing the world's limited resources and minimizing the damage to our planet is going to be difficult. The dilemma is not going to be the problem of any one discipline area; rather, it will touch each of us, in all phases of our lives. Maintaining a quality of life will necessitate new directions in our literature, economics, psychology, food choices, engineering, and even in our daily lives.

Attaining environmental quality is everyone's responsibility, and, as such, it is going to require knowledge on the part of all our citizens. If our students are to make intelligent choices they will feel comfortable living with, they are going to need you to provide them with much of the background information they will need. Our environmental problems demand our attention in every phase of the curriculum so that our students can be prepared to solve this enigma.

Three themes or stages in educating a student to prepare him for environmental choices are: 1) awareness of the environment; 2) knowledge of the environment; and 3) action in the sense of effecting a solution.

Predicting the experiences and knowledge students will need in the future is always a difficult task. However, a few basics are readily identifiable. It seems logical to assume that a person cannot make intelligent decisions if he is not aware of the problem, or even the existence of the area that has the problem. Next, it is important that he understands or has some basic knowledge about the stressed area and the stress factors involved. Finally, once an individual is aware of a problem and has knowledge about it, he must have the tools to effect a solution for the problem.

We have targeted awarenesses at the primary and lower intermediate grades, knowledge at the upper intermediate and middle school level, and action begins in

the upper middle school running through the high school and into the adult community.

The K-9 curriculum guides compiled by various environmentalists are organized around several basic conceptual schemes that were felt to be necessary for a working knowledge of the environment. In addition,these schemes and the activities suggested for their illustration, have been applied as much as possible to the unique problems of Indian River County.

A FINAL NOTE

Education about the environment can too easily become merely an academic exercise, rather than vital interaction. Many researchers have shown that the discovery method of learning allows a more thorough and lasting attainment of the desired principles and it heightens motivation at the same time. The discovery method provides an individual experience and allows success for a wide ability range of students, because it is discovering new knowledge at each student's own particular level.

Your role in the environmental education campaign is important for the student's ability to perceive the subtleties of nature will often depend on your guidance. Most often this is not done through telling the student the names of everything he sees. We need to guide him to the relationships and beauties rather than tell him about it. The student will be eternally grateful to the teacher who helps him observe the natural wonders he encounters. He will long remember the first time he saw a beautiful bird or had someone help him closely examine a delicate wildflower. If we ask him guiding questions which lead him to make his own discoveries we are doing him the greatest service a teacher can do; we are leading the person to the knowledge about using his own brain. We are showing him how to use his capacities of reason and understanding and enjoyment.

INDIAN RIVER COUNTY RESOURCES

The Florida Division of Forestry survey of 1971 showed 44.4 thousand acres of forest land in Indian River County. This report rated the land's most valuable asset as a scenic and recreation amenity. Forestland is also a favorable modifier of the increasingly contaminated environment caused by increased population growth, urbanization, and industrialization and provides relief from crowded city living.

There are five forest types. They are listed here from largest acreage to smallest.

1. Pine flatwoods, characterized by open stand of slash pine mingled with an understory of scrub palmetto and grass.
2. Hardwood and cypress swamps--include tupelo, black gum, sweet gum, some of the oaks singly or in combination, and often associated with willow, ash, elm, water hickory and maple. The soil here is rich.
3. Sand pine scrub--found on higher, drier ridges, principally on St. Lucie sands.
4. Mixed pine hardwood--found in the transition zones along major streams and drainage between the bottomland hardwood swamps and the pine flatwoods. This is a mixture of longleaf and slash pine, associated with willow oak, live oak, sweet gum and hickory.
5. Mangrove forest--along the costal islands and tidal flats, consisting of red and black mangrove in dense thickets along partially submerged lands subject to periodic wash by high tides and brackish estuarine waters.

The importance of natural hardwood, swamps, and wetlands as a natural filter should not be overlooked. Repeated studies and experience elsewhere show that

water delivered through natural drainage tends to improve in quality through the process of self-purification as it flows through and into the forest floor--that spongy, natural filter made up of debris, leaves and partially decayed vegetative duff. Water drained out of any watershed by canal will not show the improved quality of this naturally filtered product.

Although the hardwood and cypress swamps (consisting of a little over 10,000 acres of forested land) remained largely intact in this area for many years, they have been abused by over-cutting, promiscuous burning, over-grazing, and draining, all of which detract from their usefulness as a natural filter. Since 1970 drastic reductions of the hardwood Cypress community has occurred by the drainage of large areas of marsh for citrus production.

The value of mangrove forests to the marine ecosystem is well known. According to the distinguished ecologist, Dr. E. P. Odum of the University of Georgia, this interaction of land, sea, air and sunlight provides some of the richest food-producing areas in the world--20 times as productive per unit as the open sea, seven times as productive as an alfalfa field, and twice as productive as a field of corn!! Efforts should be continued to preserve the existing mangrove along the Indian River and expand it to the barren islands capable of supporting this growth. Some preliminary efforts at seed collection and restablishment are going on here and elsewhere in the state where this problem exists.

The Pelican Island Audubon Society has listed the ten major areas of Environmental and Human Concern in Indian River County. That list follows.

Areas of Environmental and Human Concern

1. Preservation and Protection of The Indian River Estuary, Including:

    a. Red and Black Mangrove swamplands
    b. Batis (pickleweed) marsh
    c. Submerged marine grass beds
    d. Spoil Islands
    e. Marshland functions
        (1) Marine productivity
        (2) Hurricane and storm protection
        (3) Wildlife feeding and nesting habitat
        (4) Pollutant filtration
        (5) Aesthetic values

2. Water Resources

    a. Shallow well aquifer
    b. Floridan aquifer
    c. Protection of recharge areas
    d. St. Johns River headwater marshlands

3. Water Pollution Abatement

    a. Sewage treatment plants
    b. Septic tanks and drainfields
    c. Canals and ditches
    d. Lakes, ponds, borrow pits
    e. Agricultural runoff
    f. Urban runoff
    g. Public health
    h. Tertiary treatment, land-spraying
    i. Sand-mining operations

4. Solid Waste Disposal

    a. Sanitary land fills
    b. Recycling
    c. Littering

5. Dune and Beach Protection and Restoration

6. Rare and Endangered Habitats

    a. Parklands
    b. Coastal forest hammocks
    c. Sand pine community
    d. Pine-flatwood community
    e. Freshwater marsh community

7. Noise Pollution

8. Air Pollution

9. Growth and Development Impact

    a. Environmental
    b. Economic
    c. Social

10. Development of Land-Use Policies and Ethics

Endangered and Threatened Wildlife in Indian River County

Endangered - Wildlife in this category are in danger of disappearing unless steps are taken to prevent this.

Birds: Wood Stork - A wetland inhabitant in marshes and water impoundments. In recent years 100-200 pairs have been nesting annually on Pelican Island.

Florida Everglade Kite - Not more than 100-150 of these freshwater marsh inhabiting birds survive in Florida. Several pairs have been found each spring in the St. Johns Water Management District reservoir west of Vero Beach, but overdrainage of this reservoir and subsequent loss of the Apple Snail--its sole food--has caused nesting failures.

Red-cockaded Woodpecker - Less than a half dozen birds occur in Indian River County, in a strip of Slash Pine forest along the upper reaches of the Sebastian River, southwest of Roseland. This species is dependent upon pines that have a fungus disease of the heartwood in which they excavate their nesting and roosting cavities.

Mammals: Florida Panther - Possibly one or two pairs of this rare carnivore, sometimes called a puma, or cougar, remain precariously in the wilder parts of Indian River County.

Manatee - Each winter several manatees are seen in the Indian River, especially in the warmer waters of the lagoon and canal near Vista Harbors and the outfall canal of the Vero Beach power plant. They are particularly vulnerable to injury by outboard motor propellers.

Reptiles: American Crocodile - This reptile is usually found only along the coastal areas of south Florida and the Keys, but a large 15-foot crocodile was found in 1974 in a pond at Vista Royale south of Vero Beach.

Atlantic Green Turtle - each year several females of this species come ashore to lay eggs on the beach.

Atlantic Saltmarsh Snake - one of the few snakes found in salt water. It is a harmless water snake and may be found inhabiting mosquito control impoundments on both sides of the Indian River.

Threatened - Wildlife not in imminent danger of extinction, but could become endangered if conditions worsen.

Birds: Brown Pelican - Indian River County probably has the largest concentration of Brown Pelicans in North America. Outside of Florida pesticides have seriously affected this species reproduction.

Magnificent Frigatebird - Occasionally seen over the Indian River and the beach and at Pelican Island. Considered threatened because its only nesting area in North America is on the Marquesas Keys near Key West.

Reddish Egret - One or two individuals are seen each year in the Indian River and at Sebastian Inlet. The last species to recover from the slaughter of the plume trade days.

Roseate Spoonbill - Several dozen or more of this species visit Indian River Cojnty during the spring and summer. Occasionally seen in larger drainage canals west of Vero Beach.

Osprey - Several breeding pairs found along the Indian River and at Blue Cypress Lake. More numerous in winter when northern birds are present.

Caracara - Only around 250 estimated to remain in Florida. One or two are sometimes seen in ranch areas in western parts of the county.

American Oystercatcher - Two, possibly three pairs nest on spoil islands in Indian River. Very intolerant of human disturbance.

Least Tern - Our smallest tern, here in summer only and often seen fishing in the surf. Dependent upon spoil islands and sand spits for nesting sites.

Florida Scrub Jay - Probably less than a dozen pairs remain in Indian River County in Sandpine-scrub oak communities near Donald MacDonald Park, Winter Beach-Gifford area along Old Dixie, and Whispering Palms area, south of Vero Beach. Dependent upon undisturbed scrub habitat.

Mammals: Florida Mouse - Found only in sandpine-scrub habitat on the Florida ridge.

Florida Beach Mouse - Although relatively common farther north, the destruction of beach dune vegetation in Indian River County has greatly reduced the numbers of this tiny, pale-brown mouse.

Round-tailed Muskrat - Found in freshwater marshes, but few remain in Indian River County because of overdrainage.

Reptiles: Gopher Tortoise - Although still frequently seen in our area, the destruction of Sandpine and Slash Pine Flatwoods habitat has greatly reduced their numbers.

Atlantic Loggerhead Turtle - Several hundred females nest each year on Indian River County beaches, but successful hatching is low because of predation by raccoons, disturbance by people and excessive beach erosion where man-made structures are too close to the beach.

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CONCEPTUAL SCHEME I

AS A POPULATION INCREASES, ITS EFFECTS ON THE ENVIRONMENT BECOME MORE PRONOUNCED.

As a population expands it approaches a limit known as the carrying capacity of the environment. The environment is only capable of supporting a finite number of individuals and, if that capacity is exceeded, the environment will not supply the needs of the surplus individuals and they will die. When the population levels are near the carrying capacity of the environment, individual members of the population will receive only their minimal requirements for life. This fundamental ecological principle applies to man and also to the quality of life that we enjoy. Our planet has finite resources and as the population expands those resources will be distributed to individuals in decreasing allotments. Thus, as man's population grows, his standard of living will be reduced.

Concept A

Members of a population tend to exhibit definite spatial distributions.

Activity 1

Obtain a current road map of Florida. Using all the keys available on the map try to make some generalizations concerning the population densities in Florida.

A. If you draw a line five (5) miles inland from the edge of the sea, what percentage of the population would live in this narrow strip around the state?

B. Why do people concentrate in this area?

C. Ecologically, is this the best place for them to live? Why or why not?

D. Why have the Orlando, Tampa, Jacksonville and Miami areas grown so large? Is this a good thing?

Source of Information:

Fernald, Edward, Florida Its Problems and Prospects. Tampa: Trend Publications Inc., 1972 (pages 42-55)

Activity 2 - Population Density

Divide the number of people in your classroom by the number of square feet available. The result will be your classroom population density. (People ÷ sq. ft. of classroom = population density per square foot on the classroom.) Now have students determine by pacing the dimensions of your school grounds. Find the school population and compute the density of students per square foot of ground. What would be the density of students per acre?

Concept B

Human population size, like that of other organisms, will be limited by environmental controls. However, by the time the carrying capacity level for humans is reached, the quality of life will be unpleasant.

A. Over-crowding in man leads to increased aggression (crime rate).

Activity 1

Keeping in mind that the population of this county has increased approximately 20% over the last ten years, ask the

students to fill in this chart.

Source of Information: Indian River County Sheriff Department

Index of Crime

1960 - 1970

Offense	1960	1962	1964	1966	1968	1970	% Increase
Murder							
Robbery							
Burglary							
Larceny							

1. Upon completing the computations have students list as many reasons as possible for this disproportionate increase.
2. How many of these reasons would be related to the often heard phrase "population explosion"? (Sociologists indicate that increased crowding results in increased crime rates.)
3. Does it appear that populations do have comfort zones? (Many feel that as a population rises above 40-100,000 in a city that all other disorders such as crime begin to grow at an alarming rate.)
4. What happens when populations go above governmental capabilities? (Higher taxes and more bureaucracy.)
5. What happens when populations are very small? Do they support governments? (Yes, and at less cost to the public.)

6. Do you think crime rates will ever come down again?
7. How much of this increase in crime is related to changing social values rather than density? (Comparing crime rates per 100,000 in a small city versus a large city such as Jacksonville could help answer the question. Large city crime rates are significantly higher.)
8. Theorize as to the reasons for density related crime? Compare the crime in single-family residential areas versus highrise apartments. What does the difference in crime rates have to do with territoriality (region, district, tract, country, land).

B. Overcrowding in man leads to abnormal behavior (suicide, psychological disorders, etc.)

Activity 2

Write letters to various state mental institutions for information on abnormal human behavior. Ask specifically for information concerning the numbers of admissions from large urban areas versus the number of small rural areas.

1. Which area showed the greatest incidence of psychological disorders? (Remember to calculate the percent of disorders from each area and do not use raw data.)
2. Why is there a greater incidence of disorders in the urban areas?

C. Crowding of humans results in increased incidence of psychological disease.

Scheme I - B

Activity 3

The following statistics are offered to the students for contemplation:

Death Due to Cancer and Heart Disease

1904 - 1970

	Per 100,000 population					
Year	1904	1924	1944	1949	1950	1970
Cancer	68	87	123	134	139	162
Heart	153	169	303	325	356	360

As cancer and heart disease are so closely linked to pollution and other modern day "additives," it is felt that these two ailments may well act as barometers for physiological disorders related to population explosion. Have students graph the above chart. Have students speculate on these figures without having specific information on the nature of these diseases. Discuss population pressures and its effect upon general health.

1. How do you think the rates of these diseases in rural situations would compare to those in the city? (Find out.)

Source of Information:

Indian River County Health Department.

CONCEPTUAL SCHEME II

WE LIVE IN A WORLD OF FINITE RESOURCES AND ALMOST INFINITE DEMANDS ON THESE RESOURCES.

Many of our natural resources, particularly mineral resources and energy resources, are finite. There is only a limited amount; when they are gone they will never be replaced. In addition, man has made many of the world's renewable resources finite by his mismanagement of the resources.

Many of our resources which depend on cyclic patterns to replenish themselves have been altered by man. When man consumes more of a resource than nature is recycling, he upsets the cyclic pattern and produces a situation whereby the resources become finite. There will be a time when the resource is consumed and the cycle breaks down because it can no longer replenish itself.

We see this in many life cycles; from bacteria in our soil which convert nitrogen, carbon and sulfur to usable products, to our ever increasing endangered wildlife species and mineral and natural resources, e.g., timber and fisheries. These resources are being overharvested or interfered with by man's technological needs.

Concept A

Conservation responsibilities must be shared by individuals, businesses and industries, special interest groups, and all levels of government.

Scheme II - A

Activity 1

Choose a particular natural resource for special study. Prepare a written report on:

A. the need for conserving this resource and

B. some promising conservation practices which are being used or should be used. Illustrate report with drawings, maps, pictures, charts, etc.

Activity 2

Draw a poster urging some particular conservation practice, such as preventing forest fires, saving fuel or water, etc.

Activity 3

Discuss the following questions:

a. Describe some of our state's fish and game laws. What licenses are required? How are the laws enforced? What is the general purpose of these restrictions?

b. What are some things that young people could do to improve scenic beauty in your locality? What help would you need to obtain from the local government?

c. Is air pollution a serious problem in your community? If so, what are the chief causes? What remedies can you suggest?

Source of information:

Indian River County Health Department, Planning Department.

Scheme II - A

Activity 4

Gather pictures of good and bad practices in use of resources. If possible, photograph some scenes yourself. Prepare a bulletin board display.

Activity 5

Perform an experiment before the class demonstrating some conservation problem, such as:

a. testing garden soil, or

b. showing the effect of falling water on top soil.

Activity 6

Quotes for discussion:

1. "There is something deranged about the whole environment crusade. Its members are hostile to the way of human life as tradition knows it. If the worship of nature over people continues, it could be a death wish for Western society."
2. "The energy crisis could help Americans rearrange their priorities concerning the so-called "necessities" foisted on them by the nation's goods producers. In this way, our natural environment could reap wondrous benefits and Americans can make their society less wasteful and more just."

Activity 7

Select and defend one of the following positions:

A. Recycling of beverage containers has many advantages in addition to preserving precious resources. It

also saves energy; e.g., nearly 90 percent less energy is needed to manufacture cans made with recycled aluminum.

B. Recycling is not the answer. It still has not eliminated litter and pollution problems. It involves endless energy in collecting, sorting and remanufacturing. But a national standard of returnable bottles, similar to Oregon's new "deposit " law, would save enough energy to generate electricity equal to that required by 11 million people.

SOURCE OF INFORMATION:

Rodale's Environmental Action Bulletin, Emmaus, Pa. (Copies on file at library of Pelican Island Audubon Society located in Florida Game & Fresh Water Fish Commission office, corner of 14 Ave. and 19th St.)

CONCEPTUAL SCHEME III

EACH INDIVIDUAL HAS A ROLE AS AN AGENT FOR CHANGE IN THE ENVIRONMENT AND, THEREFORE, HAS A RESPONSIBILITY TO THE ENVIRONMENT.

Each of us, by the nature of the way we live, has an effect on the entire area which we inhabit. We have a distinct effect on our physical environment, from the food we eat to the electricity and "toys" we require; clothes we wear; litter; garbage and sewage we produce.

The more we demand in the way of man-made products, services and comforts, the more our natural environments must be changed to accommodate us. In other words, we make trades continually. To use electricity, we must pollute our environment. To promote bigger cities and more people, we must change or destroy the natural landscape and its related ecological cycles. We must realize, however, most of our trades are irreversible and we cannot trade back for what we had before. For instance, a mangrove or cypress forest, which took millions of years to develop and upon which so many ecological interrelationships depend, cannot be re-established once man has draglined or dredged and filled it for a housing development. It cannot, even in many generations of man, be returned to the productive swamp it once was. It is, for all practical purposes, gone forever.

We must become aware of how our trades affect us before we make them. Our purpose, therefore, is to create an environmental literacy through our society and each of us as

Scheme III - A

individuals can begin to make knowledgeable environmental decisions.

Concept A

When an individual makes a purchase of a material good, he spends some of his environmental quality as well as his money.

Activity 1

Have each student keep a list of the goods and services that their family purchases during the next week. In class have the students analyze their lists and determine what environmental damage was done to produce each of the items that they listed. You will have to help them determine the damage to the environment for some of the items they purchased.

1. Do any of the things your family purchased cause more damage than other items?
2. Could you live without the more damaging items?
3. When you buy something that has caused environmental damage to produce, is the damage your fault or the manufacturer's fault?
4. Do you frequently have choices between items that will serve the same function?
5. Where one is less damaging than the other (returnable vs. non-returnable, big car vs. little car, etc.)? Which choice should you make?

Scheme III - B

Concept B

To actively work to save the environment an individual must understand local, state, and national politics. (Have students write letters to Congressmen, Senators, etc.)

Activity 1

Have the class pick a conservation issue that they are really interested in. Try to determine through all levels of government and public education exactly what it would take to solve that problem. Help the students avoid the pitfalls of being too simplistic.

Activity 2

Small groups of students should attend a local session on the City Council or County Commission over a period of time. They should write reports of each meeting and discuss them with the class or publish them in a school newspaper.

Activity 3

Write a letter to a Congressman, to a Senator and to a United States Congressman. Ask them to send information to you regarding their specific level of government.

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"The Ecological Crisis." Society for Visual Education, 1971. Six (6) filmstrips color sound (cassettes). Contents: some ecological considerations, population statistics, population trends, evolution and extinction, pesticides, pollution.

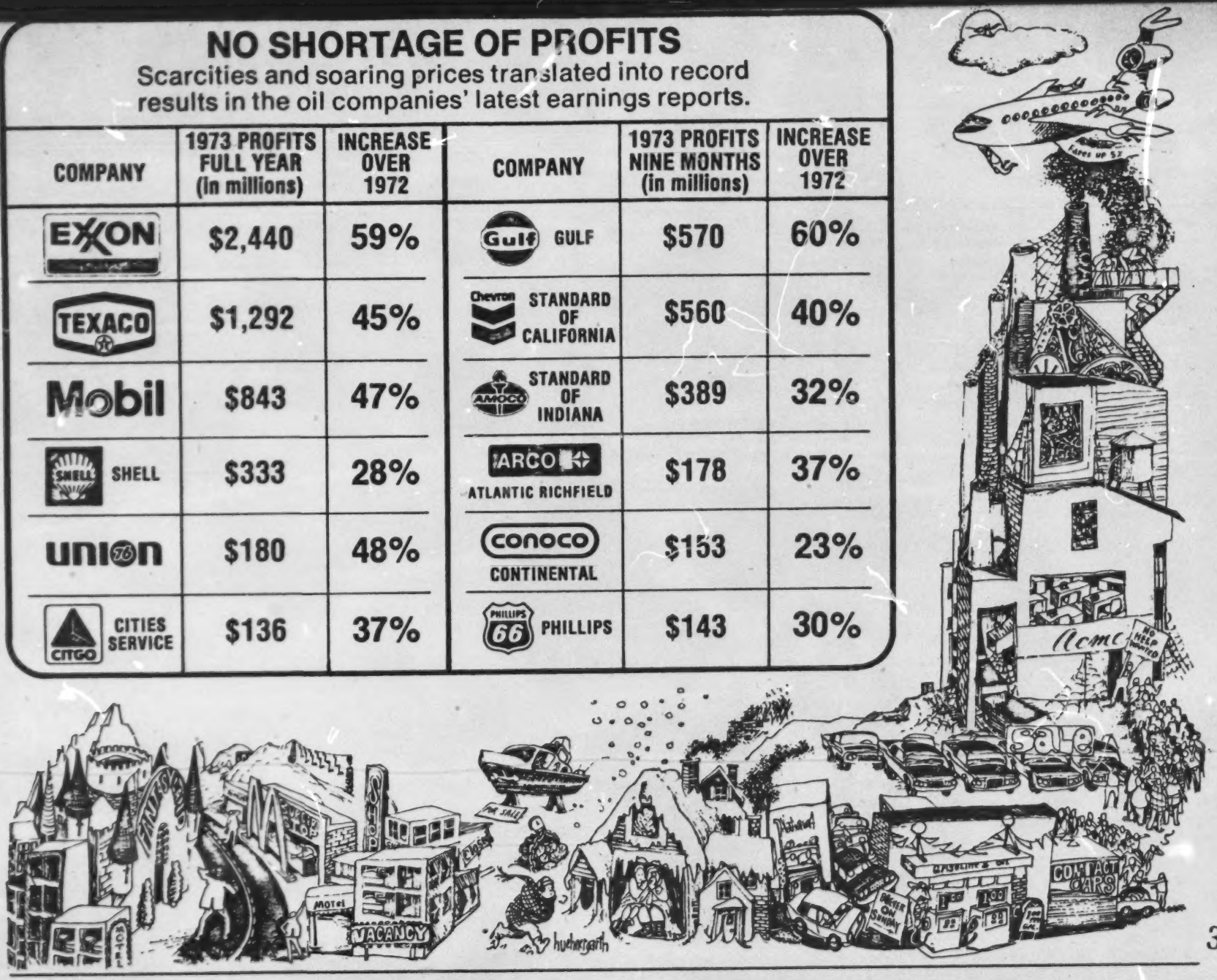
"Environment Changing Man's Values." Guidance Associates, 1970. 93 Frames color sound.

APPENDIX

NO SHORTAGE OF PROFITS

Scarcities and soaring prices translated into record results in the oil companies' latest earnings reports.

COMPANY	1973 PROFITS FULL YEAR (in millions)	INCREASE OVER 1972	COMPANY	1973 PROFITS NINE MONTHS (in millions)	INCREASE OVER 1972
EXXON	$2,440	59%	GULF	$570	60%
TEXACO	$1,292	45%	STANDARD OF CALIFORNIA	$560	40%
Mobil	$843	47%	STANDARD OF INDIANA	$389	32%
SHELL	$333	28%	ATLANTIC RICHFIELD	$178	37%
union 76	$180	48%	CONOCO CONTINENTAL	$153	23%
CITIES SERVICE	$136	37%	PHILLIPS 66 PHILLIPS	$143	30%



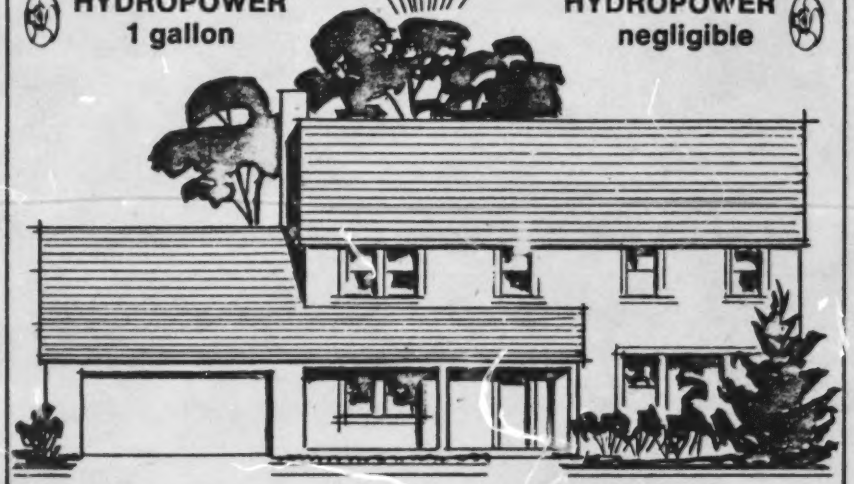
VISUAL 1

VISUAL 2

AMERICA'S GROWING APPETITE FOR POWER

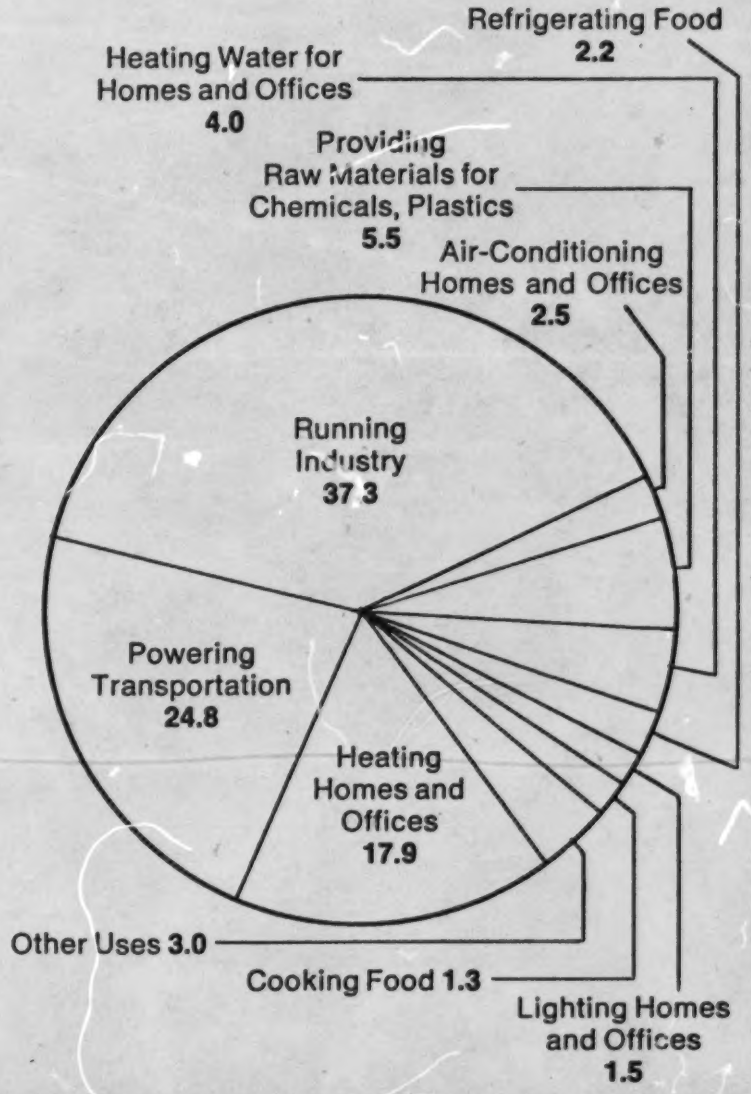
Daily use of energy by the average household:

1972	1985
COAL 46 pounds	COAL 70 pounds
OIL PRODUCTS 9½ gallons	OIL PRODUCTS 15 gallons
NATURAL GAS 7 gallons	NATURAL GAS 12 gallons
NUCLEAR ENERGY ½ pint	NUCLEAR ENERGY 5½ gallons
HYDROPOWER 1 gallon	HYDROPOWER negligible

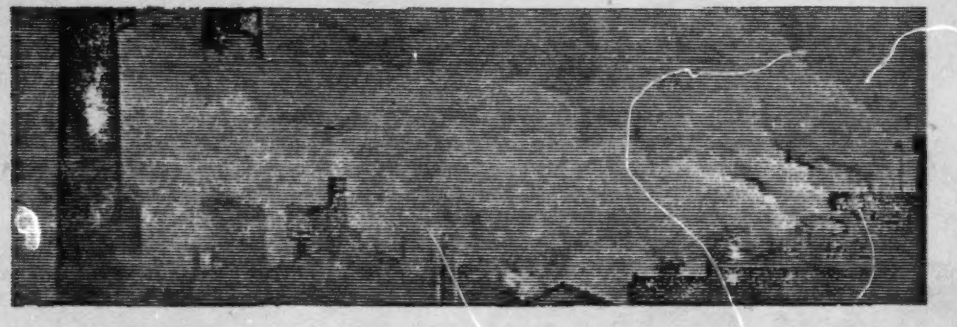


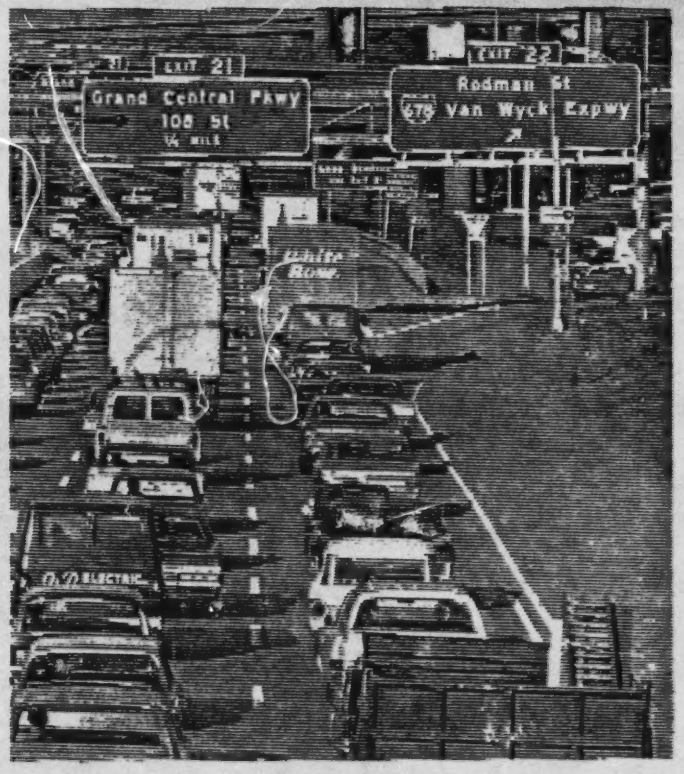
WHERE AMERICA'S ENERGY GOES

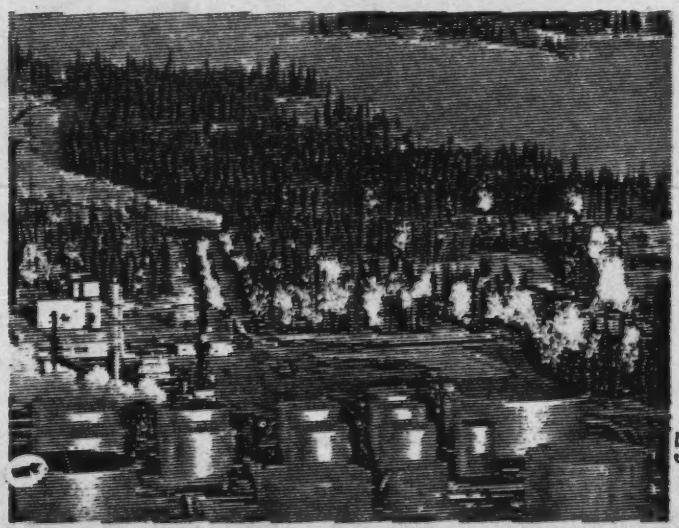
Percentage of All Energy Used in U.S.


Refrigerating Food 2.2
Heating Water for Homes and Offices 4.0
Providing Raw Materials for Chemicals, Plastics 5.5
Air-Conditioning Homes and Offices 2.5
Running Industry 37.3
Powering Transportation 24.8
Heating Homes and Offices 17.9
Other Uses 3.0
Cooking Food 1.3
Lighting Homes and Offices 1.5

THE ENERGY SQUEEZE: WHY?



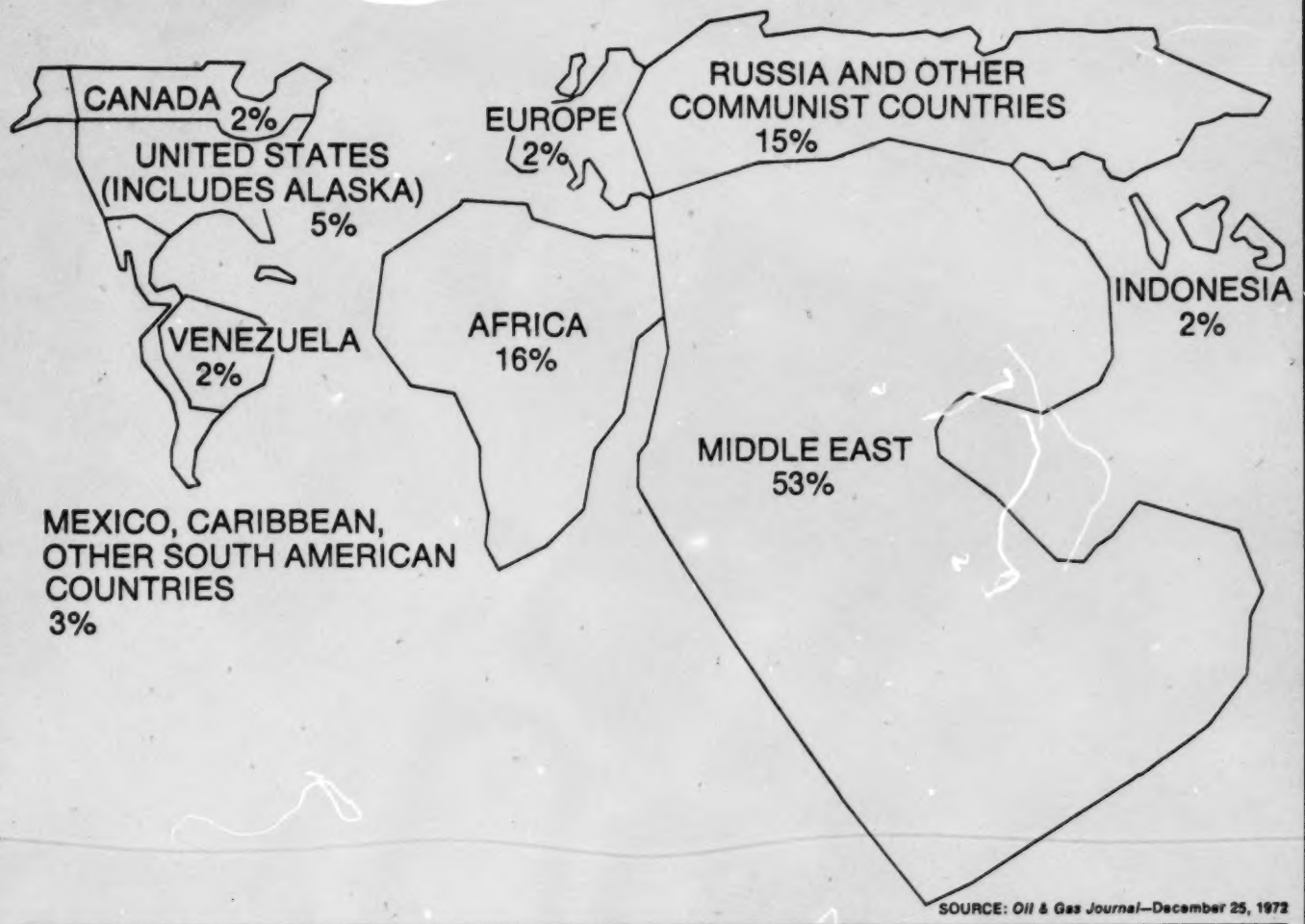




34
VISUAL 3

5

THE WORLD OF KNOWN OIL RESERVES.



SOURCE: *Oil & Gas Journal*—December 25, 1972

THE TREASURE TROVE

Sources: U.S. Geological Survey and U.S. Bureau of Mines

VISUAL 4

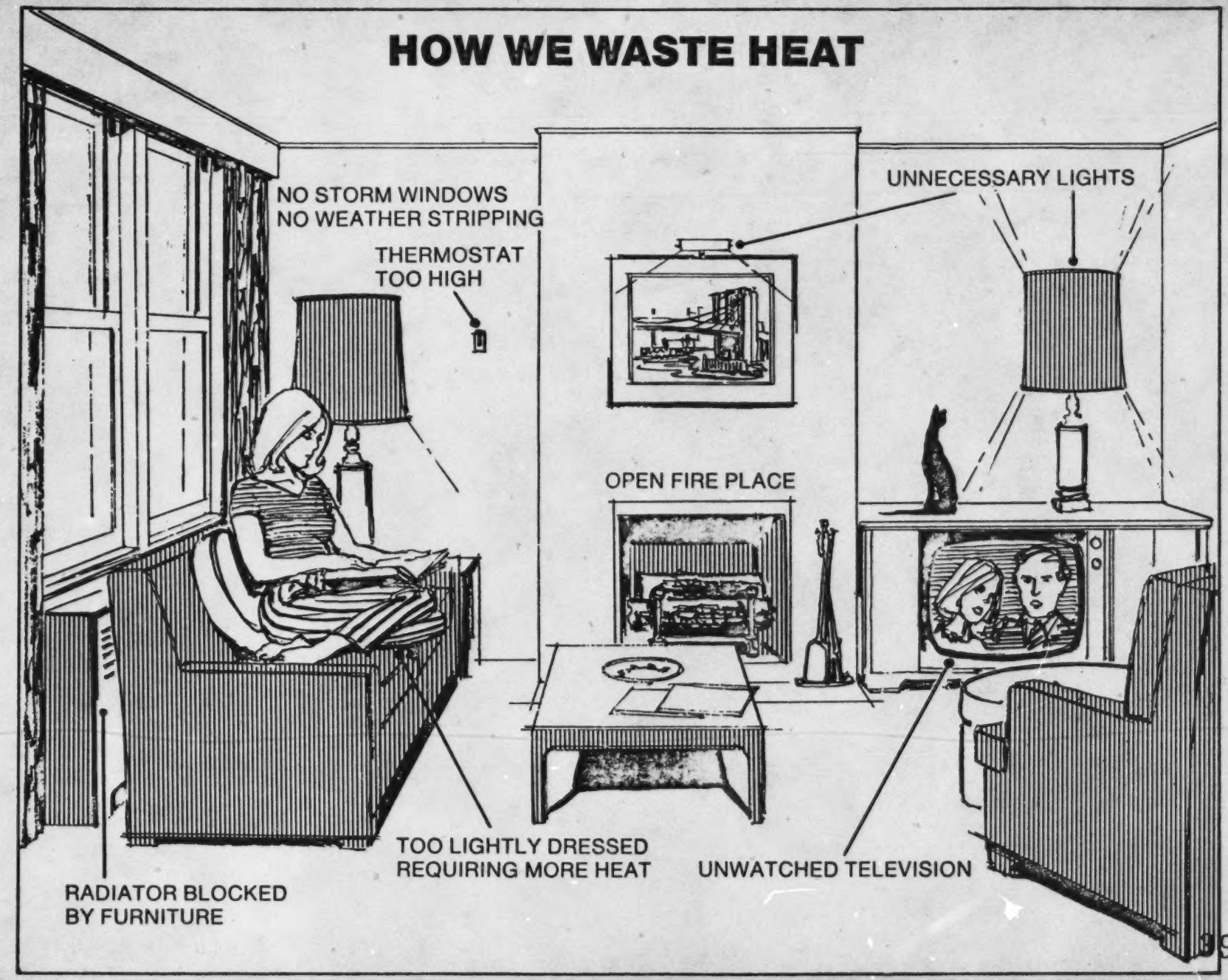
Mideast Oil—See How It Spreads

	1972 OIL CONSUMPTION *(in millions of tons)*	PERCENTAGE FROM MIDEAST IN 1972	PROJECTED PERCENTAGE FROM MIDEAST BY 1980
UNITED STATES	854	4%	25%
WESTERN EUROPE	775	72%	50%
JAPAN	261	78%	88%

VISUAL 5

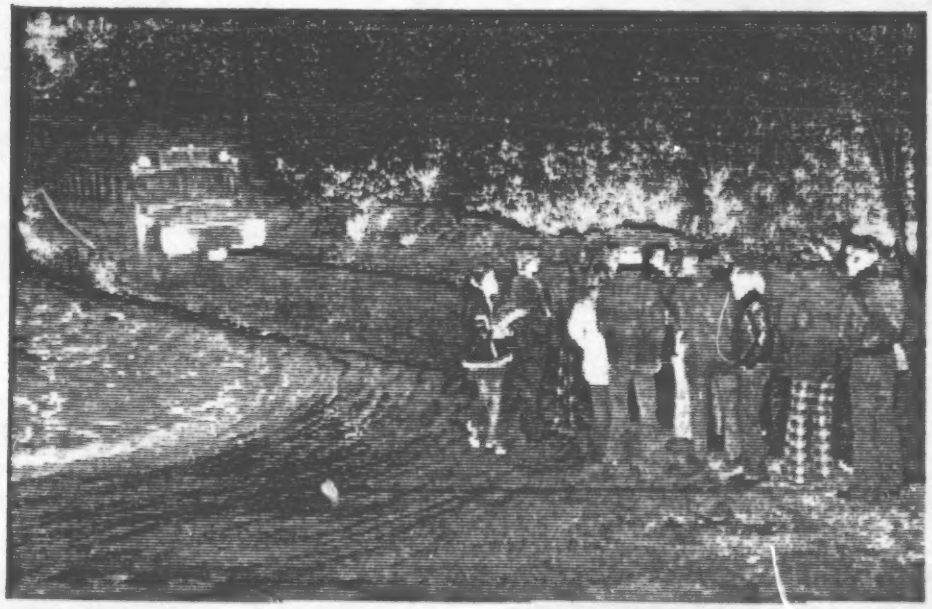
VISUAL 6

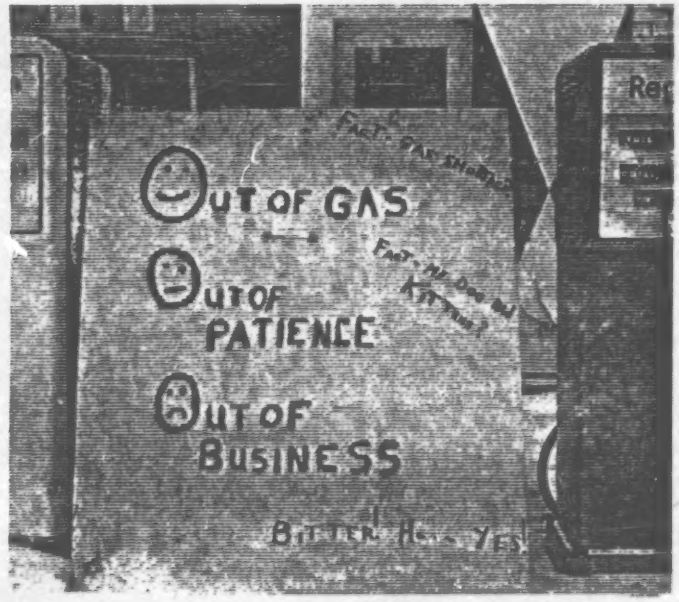
HOW WE WASTE HEAT



Save gas
The Duro-Test Watt-Saver. 90 Watts.
It performs like our 100 watt light bulb.
unfair to Con Ed?
COTTON HELP EASE THE ENERGY CRISIS?
Only Duro-Test makes the Watt-

ENERGY SAVING MEASURES





VISUAL 9

"Americans consume almost six times the world per capita of energy. Our supply of available fossil fuel is running out. New technological development is lagging. Increasingly, we will become more dependent on oil from third world nations who will be loathe to let us have it. America's energy future is bleak."

"The energy situation in the U.S. will be tight for 5 or 10 years at worst. After that, things will get better quickly. Despite our past extravagance, our energy resources are massive. Add to this the prospect of great technological breakthroughs in non-fossil fuels and the picture is very bright."

RESOURCES

Growing demand is depleting known reserves of some key U.S. minerals.

	RESERVES	WILL LAST
IRON	9 billion tons	72 years
COPPER	76 million tons	38 years
ZINC	49.5 million tons	28 years
LEAD	38 million tons	27 years
BAUXITE	40 million tons	2.2 years
MANGANESE	none	—

Source: U. S. Geological Survey

RECYCLING

Reusing materials saves vital resources — but more can be done.

	SCRAPPED ANNUALLY	RECYCLED AMOUNT	RECYCLED PER CENT
	Millions of Tons		
COPPER	2.5	1.5	**61%**
ALUMINUM	2.2	1.0	**48%**
LEAD	1.4	0.6	**42%**
NICKEL	0.1	0.04	**40%**
STEEL	141.0	36.7	**26%**
ZINC	1.3	0.2	**14%**

Source: National Association of Secondary Material Industries

VISUAL 10

6GX31 - 6.12 EDUCATIONAL FIELD TRIPS AND EXTRA-CURRICULAR TRIPS.

(1) Special school trips shall be classified as follows:

(a) Educational field trips. Any trip which is directly related to a unit of instruction being studied by a particular group of pupils shall be considered an educational field trip when it occurs during the school hours, or attendance is required, or the grade of the student is influenced by participation in the activity.

(b) Extra-curricular trips. A trip which is not directly related to the instructional program but which is related to a school sponsored activity shall be considered to be an extra-curricular trip.

(2) Approval of trips.

(a) There shall be developed within each school a program of field trips suitable to each grade level so that there will be a variety of experiences.

(b) A list of suitable educational trips, prepared at intervals by the instructional staff and approved by the superintendent, shall be distributed to all schools. The principal shall obtain the approval of the superintendent for any educational trip not on the approved list. The list shall show educational field trips and extra-curricular trips separately.

(c) The teacher shall submit plans for a trip to the principal for approval who in turn shall submit such plans to the superintendent for final approval at least five (5) days prior to the date of the planned trip.

(3) Parental permission. Written permission of the parent or

guardian shall be required for any pupil who goes on an educational or extra-curricular trip unless the student has attained eighteen years of age. Written permission shall be provided for each trip except for the activities approved by the Florida High School Activities Association.

(4) Nonparticipants. Proper arrangements shall be made for any pupil or pupils who do not go on a planned field trip.

(5) Costs. No charge may be made to a pupil for the cost of an educational field trip. Charges shall be made to the school as provided in Rule 8.13.

(6) Transportation for field trips.

(a) The use of a school bus will be allowed for educational trips after proper arrangements have been made. The provisions of Section 8.13 of these regulations shall apply to all educational field trips.

(b) Trips shall be planned so that the use of the school bus will not interfere with the normal school transportation pattern.

(c) The use of private automobiles for educational and extra-curricular trips is discouraged; but if approved, liability and medical insurance in the amounts required by law shall be mandatory. Any driver shall be an adult and shall hold a valid Florida driver's license. The teacher-sponsor shall see that the provisions of this rule are carried out.

(d) There shall be a non-student adult chaperone in each vehicle. When practical, the chaperone shall be a member of the administrative or instructional staff. The driver of a school bus shall not be considered a chaperone.

(7) No educational field trips may be made during the last two weeks of any school year except by special approval of the superintendent.

Authority: 230.23(7),F.S. Implemented: 230.23(8); 230.33(10),F.S.